A Formula for expressing the Decrement of Human Life.   By the late Dr. Thomas Young.

THE investigation of the laws by which the general mortality of the human species appears to be governed is of equal importance to the statesman, the physician, the natural philosopher, and the mathematician; and as you * have had occasion to pay particular attention to the subject, I trust that it will not be disagreeable to you to receive the results of an inquiry, into which I have entered, for the purpose of appreciating, if not of reconciling, the many discordant opinions that have been advanced respecting the com- parative mortality of mankind, at different times and under dif- ferent circumstances.

Of late years there is little doubt that, whether from the pro- tective effects of vaccination in infancy, or from the increase of the comforts of the poorer and of the temperance of the more affluent classes of society, or in some measure also from the simplification of the practice of physic and surgery, there is a decided increase in the mean duration of life in many parts of Europe : but it is also extremely probable that this improvement has been greatly ex- aggerated; partly on account of the limited description of the persons on whom the observations have been made, and partly from an erroneous opinion respecting the profits of certain esta- blishments, which have been attributed to the employment of too low an estimate of mortality, while they have, in fact, been princi- pally derived from the high rate of interest which the state of public credit has afforded.

A very laborious and well informed actuary has lately asserted, before a Committee of the House of Commons, that " the duration of existence now, compared with what it was a hundred years ago, is as four to three, in round numbers." (*Parl. Rep.*, N. 522, p. 44.) It does indeed happen, that this particular result may in one sense be very correctly deduced from the immediate comparison of the annual mortality of a certain number of persons of the same de- scription, that is, annuitants, at the periods in question ; nor is it possible to deny that some importance must be attached to the remark : but the mortality of the same class of persons in France, at the earlier period, was no greater, according to Mr. Deparcieux's estimate of their longevity, than in England at the later, while the general mortality in France has never been materially less than in England, and appears at present to be even somewhat greater :

* The writer is addressing Sir Edward Hyde East, Bart., M.P., F.R.S.

and it can only be conjectured, that the annuitants of the Tontine of King William were in general most injudiciously selected, while those who were the subjects of Mr. Deparcieux's observations, like the annuitants of the modern Tontines, were chosen with more care or with greater success. Mr. Finlaison's tables, therefore, though they may be extremely just and valuable for the purpose of setting a price upon annuities to be granted on the lives of the proposers, cannot with any prudence be adopted where the parties concerned have an interest in offering the worst lives that they can find, notwithstanding any partial security that might be afforded by the exercise of medical skill in their rejection; and if it is true that some of the Tontines were principally filled by lot (*Rep.* p. 16), with the children of country clergymen and magistrates, it must still be supposed that the families of such persons may have been more healthy than the average of the population of London and the country taken together.

For the comparison of the general characters of different tables of mortality, the simplest and most obvious criterion is perhaps the number of individuals out of which one dies annually, which is also the number of years expressing the expectation of life at the time of birth; but this test is liable to material objections with regard to the most usual application of the table, which depends more on the comparative expectations at later periods than in early infancy. For example; the Northampton Table affords results, throughout the whole of middle and advanced life, agreeing almost exactly with De Moivre's hypothesis of equal decrements, although the *annual mortality* is supposed to be nearly 1 in 25 at Northampton, instead of 1 in 43, as assumed by De Moivre. It would therefore be very unjust for a person allowing the truth of De Moivre's hypothesis to condemn the practical employment of Dr. Price's tables in common cases, on account of this variation only. A less exceptionable test will be, to find the mean of the numbers expressing for different ages the *full term* of life, or the sum of the age and twice the expectation, taking the decads from 10 to 80 as the most important. Another standard of comparison may be the age which is equal to the expectation of life, and which, in De Moivre's arithmetical hypothesis, is the *mean age* of all the population, and probably very near it in all tables formed from actual observation. In this manner a general comparison of the most remarkable tables may be instituted.

The order of the mortalities expressed by the first column of the following table is—Simpson, Northampton, France, Dupré, Halley, Sweden, Carlisle, Tontine 1695 males, females, Deparcieux, returns

of 1811, Tontines of 1800, males, and females; the order of the second column is—Simpson, Tontine of 1695, males, Dupré, France, Halley, Northampton, females 1695, pensioners, Sweden, Tontines of 1800, males, Carlisle, females of 1800 : but besides this difference in the order, the disproportion exhibited in this column is less enormous than in the former; the numbers of the Carlisle Tables, for example, exceeding those of the Northampton by one half in the former, and by one tenth only in the latter. The proportion of Mr. Finlaison's Tontines also stands as 3 to 4 in the first, and as 7 to 8 or 8 to 9 only in the second : the latter comparison giving a much fairer practical estimate of the comparative longevity, indicated by the tables, than the former.

(To be continued.)

FOREIGN INTELLIGENCE.

GERMANY.—*New Business and Position of the German Life Assurance Companies for* 1855.—The two following tables have been forwarded to us by Herr Rath G. Hopf, Foreign Correspondent of the Institute of Actuaries at Gotha. They contain some interesting facts.

A statement similar to Table II., for the year 1853, will be found in the *Assurance Magazine,* vol. v., p. 159; and for 1852, in vol. iv., p. 136; and for 1850, in vol. iii., p. 233. The five last Companies in the list (at Weimar, Schwerin, Coeln, Stuttgart, and Halle) have been established since the date to which the last report referred. The new assurances during the year show a great extension of business in 1855 as compared with 1853 — the new persons or policies being, in the former, 9,366, for £1,361,711, and in the latter, 5,558, for £939,853; and the assurances existing at the end of the year, 61,832, for £10,411,547, compared with 50,019, for £8,750,237. The income from premiums and interest has increased from £400,184 in 1853, to £477,281 in 1855; the claims, from 957 in number, assuring £173,527, to 1,426, assuring £225,319; and the total assurance funds, from £1,821,126 to £2,099,643.

The average amount of the sum assured by each policy is small, very little more than £145, and appears to be gradually diminishing with the extension of business. In 1852 it was £161. The average of each policy in force at the end of the year 1855 was £168, and of each claim during the year, £158.

In the course of the two years 1854 and 1855 the new assurances have increased 45 per cent.; the assurances in force, by 19 per cent.; the claims, by 30 per cent.; and the assurance funds, after payment of claims and expenses, by more than 15 per cent. The claims in 1855 on the assurances in force at the beginning of the year, added to half the new business of the year, averaged 2·26 per cent.; and considering that the great bulk of the assurances are in Offices of more than twenty years' standing, these results cannot but be considered as highly satisfactory.   (S. B.)